

suitable for cultivation in beds and borders, whilst others may be used for adorning pergolas, arches, pillars, summer-houses, or other structures. Directions are given for cultivation and propagation, the process of budding being explained fully and illustrated with appropriate cuts. Those who are not familiar with the varieties will find the selections of roses for different purposes of great assistance in choosing those which will be most suitable for their particular gardens.

The text is large, bold print, and this being upon parchment paper, the convenience of the reader has been obviously studied. The coloured plates have been prepared from paintings of well-known artists, and many of them are pleasing, but others are too impressionist in character, particularly that representing a Dorothy Perkins rose growing upon old trees. The effect of the rosy crimson flowers is depicted, but one cannot in the least trace any rose foliage, and even the plant itself takes no shape, and, therefore, cannot be distinguished.

The second part contains the concluding portion of the letterpress on roses, and the remaining pages are devoted to bulbous plants. The third part is a continuation of the matter concerning bulbs. It contains excellent coloured plates of *Lilium speciosum*, "Christmas Roses and Glory of the Snow," and "Madonna Lilies and Roses." These are the best plates in the third part, and the figure of a church as the background to the last-mentioned picture is an agreeable and appropriate feature.

The Philosophical Basis of Religion; a Series of Lectures. By Dr. J. Watson. Pp. xxviii+485. (Glasgow: J. MacLehose and Sons, 1907.) Price 8s. 6d. net.

PROF. WATSON, who is already well known to philosophical students by his work on Kant, has, by the publication of this collection of lectures, laid a still larger circle of readers under an obligation. The recent congress at Oxford gave sufficient evidence of the present widespread interest in religion as a social phenomenon—an interest largely independent of any attitude towards its claims upon the individual. There will be many scientific students who will turn with profit to Prof. Watson's addresses—admirably lucid as they are, and agreeably free from technicalities—for a treatment of the subject that forms an entirely necessary complement to the comparative method.

The author presents his argument as an attempt to solve the problem of re-building upon a basis of reason the theological beliefs which (he holds) no longer rest securely upon their ancient foundation of authority. The solution he develops takes the form of a "constructive idealism" based upon "the principle that the world is rational and is capable of being comprehended by us in virtue of the rationality which is our deepest and truest nature." The fulfilment of this programme necessitates an examination, first, of typical views on the nature and functions of dogma (such as those of Newman, Loisy, and Harnack), and, secondly, of certain current philosophical doctrines (personal idealism, the "new realism," and pragmatism) that offer solutions of the author's problem which for one reason or another he is unable to accept.

The layman will find Prof. Watson a fair-minded, an interesting, and, on the whole, a trustworthy guide in all these matters, as well as in the lectures on theological history which follow in somewhat loose connection with the rest. He should be warned, however, that the account of the "new realism" given in the fifth lecture contains elements that most of the supporters of that doctrine would repudiate.

Every reader of the book will be grateful for the excellent summaries of the preceding argument which appear at the beginning of most of the lectures.

A Manual of Bacteriology, Clinical and Applied. By Prof. R. T. Hewlett. Third edition. Pp. xii+638. (London: J. and A. Churchill, 1908.) Price 10s. 6d. net.

The publication of Prof. Hewlett's manual in its new edition serves to remind us of the enormous strides in our knowledge of bacteria which have been made within the last ten years. Bacteriology in its early days meant little more than the study of the morphology of the newly-discovered causes of disease and the search for those undiscovered. Then came the investigation of the poisons manufactured by the organisms; and now the bacteriologist is largely concerned with the substances whereby the organisms are controlled and defeated. Much of the new knowledge of bacteria has come with the discovery that the organisms once believed to be unique are in many cases only members of groups which number dozens or scores of individuals; and the aid of organic chemistry has been invoked to differentiate the members of these groups.

With this constantly widening field of work it has become increasingly difficult to give within a moderate compass an account of our present state of knowledge, and we can therefore all the more congratulate Prof. Hewlett on his success. Within the 600 pages of his book he has contrived to give an adequate account of the methods used in bacteriological research; of the morphology, appearances in culture, and distribution of the chief pathogenic bacteria; of bacterial toxins; of immunity, and the various methods by which it is sought; and, lastly, of the details of disinfection, and the examination of water, air, soil, and milk. He has wisely omitted many of the details of the more complicated methods, but wherever he has done so he has been careful to give a full reference to a source where the reader can obtain the information. In his treatment of some of the more recent work in bacteriology he, in our opinion quite properly, reserves his judgment of its value, while stating fully and fairly the claims advanced. Thus, for example, he still hesitates to accept without reserve the *Treponema pallidum* as the specific organism of syphilis, but adds that the majority of observers hold the opposite opinion strongly.

The illustrations are for the most part reproductions of actual photomicrographs, and are particularly well chosen and clear in outline. The only fault that we have to find with Prof. Hewlett is an occasional obscurity of language; in most instances the context removes any doubt as to his meaning, but in a few cases it is difficult to comprehend. Thus on p. 343 the language seems to imply that there were two dead men who recovered, and though, of course, that is not the meaning, the whole sentence remains obscure, even after the obvious correction has been made.

Ticks. A Monograph of the Ixodoidea. Part i. (Argasidae). (London: Cambridge University Press, 1908.) Price 5s. net.

THE study of parasitic and disease-producing Protozoa, which has received such a great impetus of recent years, has caused much attention to be paid also to those groups of animals which, by their blood-sucking habits, are instrumental in transmitting the parasitic organisms from one vertebrate host to another. Ever since Smith and Kilborne first made known the rôle of ticks in transmitting Texas-fever in cattle, much attention has been directed to this group of arachnids,

which were subsequently found to be the intermediary for the transmission of the remittent fevers, caused by the presence of spirochaetes in the blood, of man in Africa, and of domestic fowls in various countries.

For those who are not experts on ticks, but are made practically acquainted with them from the pathological point of view, a comprehensive monograph or handbook of the group has become an urgent requirement, and this need will now be supplied by the monograph of the Ixodoidea which is being produced by Messrs. Nuttall, Warburton, Cooper, and Robinson. Part i., dealing with the Argasidae, has appeared, and consists of 104 pages (not including the bibliography of 18 pages), with three plates and 114 text-figures. This monograph will undoubtedly be a most useful publication, and it is to be hoped that this example will be imitated with respect to other groups of blood-sucking invertebrates. A modern comprehensive monograph of leeches, for instance, is also a work urgently needed by those who desire to study the transmission of the blood-parasites of fishes and lower vertebrates.

Who's Who, 1909. Pp. xxiv+2112. (London: A. and C. Black.) Price 10s. net.

Who's Who Year-Book for 1909. Pp. vi+154. (London: A. and C. Black.) Price 1s. net.

The Englishwoman's Year-Book and Directory, 1909. Edited by G. E. Mitton. Pp. xxvi+372. (London: A. and C. Black.) Price 2s. 6d. net.

The Writers' and Artists' Year-Book, 1909. Pp. vii+121. (London: A. and C. Black.) Price 1s. net.

THESE four works of reference are so well known and widely esteemed that it is hardly necessary to say more than that each maintains its high level of excellence. "Who's Who" continues to increase in bulk; this year there are 72 pp. of additional matter, indicating the editor's desire to make his roll of honour as comprehensive as possible.

The "Who's Who Year-Book" is made up of the tables which were formerly published in "Who's Who," with many new lists, including, we notice, one of the Nobel prizes awarded since 1901.

Every particular of importance about the useful work women are doing is to be found in the "Englishwoman's Year-Book and Directory"; and as the Editor remarks, "no woman who takes any part in public or social life can afford to be without it." Even a glance through the volume will serve to show that women are making notable contributions to knowledge, and taking an honourable part in every form of activity intended to improve the conditions of human life.

The title of the fourth year-book sufficiently describes its scope; the volume should prove of great assistance to young writers and artists.

Arcana of Nature. By Hudson Tuttle. With an Introduction by Dr. Emmet Densmore. Pp. 471. (London: Swan Sonnenschein and Co., 1908.) Price 6s. net.

DR. DENSMORE'S introduction includes memoirs of Emanuel Swedenborg, A. J. Jackson, Hudson Tuttle, Cora Richmond, and W. J. Colville; and this fact—since all are described here as "psychics"—will serve to indicate the scope and character of the volume. "The Arcana of Nature" was published in 1860, and its subtitle, "The History and Laws of Creation," shows its ambitious aim. Dr. Densmore has been impressed with the phenomena to which attention is directed in this volume, and he feels they deserve consideration "from the psychic student as well as from the general public."

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LETTERS TO THE EDITOR.

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Flying Machines and their Stability.

IN the early part of this year I suggested in a letter to NATURE (vol. lxxvii., p. 293, January 30) that it would be desirable for experimenters with flying machines to direct their attention to automatic stabilising appliances, and the character of the accidents which have occurred since that letter was written tends to emphasise the importance of this.

Among the six degrees of freedom possessed by any body free to move in three dimensions, viz. \dot{x} , \dot{y} , \dot{z} , $\dot{\theta}$, $\dot{\phi}$, $\dot{\psi}$ (x being horizontal in the direction of motion, y and z horizontal and vertical, and θ , ϕ , ψ angular velocities about x , y , and z), \dot{x} , \dot{y} , and \dot{z} may be controlled by hand, but for steady motion it is requisite that $\dot{\phi}$ and $\dot{\psi}$ should be zero except when the course is changing, and $\dot{\theta}$ should be zero except when the horizontal curvature of the course is changing.

Of these angular velocities, any of which may be caused by instability, $\dot{\theta}$ is the most dangerous, and it is to the automatic extinction of this that attention should be directed in the first place. (This is the form of instability which most kites suffer from in strong winds.) $\dot{\phi}$ may be a source of danger if the pitching or diving is considerable, but $\dot{\psi}$, which corresponds to a wandering course in the horizontal plane, may be dealt with by steering.

There can be little doubt, I think, that for aeroplanes the best method of correcting for $\dot{\theta}$ is that adopted by the Wrights, namely, the alteration of the relative inclination of the wing surface on either side. In this they are following the practice of the long-winged birds, but the control should be automatic.

Automatic control of the wing surfaces could be effected by any device which would copy with power the position of a short pendulum without exerting any force on the pendulum itself.

The pendulum must be short, because $\dot{\theta}$ must be related, not to the absolute vertical, but to the direction of the resultant of gravity and the centrifugal force due to the horizontal curvature of the course (whatever that may be), and a pendulum with a short period and considerable extinction sets itself very quickly in this direction.

It may be remarked that the same class of device could be used for the automatic control of $\dot{\phi}$. The problem here presented offers a large field for invention.

Too much stress is often laid on the particular forms given to the wing surfaces. In reality, flight is possible with almost any form of wing if appropriate surface speeds are used.

In nature flight is conducted in two ways, of which, among birds, the albatross and humming-bird may be cited as extreme examples. With the first of these the body speed must be high, and much power has to be exerted in starting before the economical speed is reached. With the latter the body may be stationary, but the wing speed is always high.

This type of flight corresponds to "lifting screws" on a flying machine, and with this form, I believe, no success has hitherto been achieved. It seems not impossible, however, that with proper balancing appliances it will ultimately prevail, considering what great advantages it offers in the matter of starting and stopping. In the matter of economy of power, also, it is obviously better to use, if possible, the same surface both for support and propulsion rather than separate propellers as aeroplanes must do. If the aeroplanes could propel themselves by flapping their wings, the latter objection would not apply.

A. MALLOCK.

6 Cresswell Gardens, S.W., December 16.